AMENDMENTS TO CLAIMS

1. (Currently Amended) A method for finding a range, comprising:

(a) receiving laser beams reflected from a target ~~and input~~, and outputting a corresponding electrical signal;

(b) converting the electrical signal into range-finding data;

(c) sequentially storing the range-finding data;

(d) adding the stored range-finding data and previously processed and stored accumulated data, and storing results as accumulated data;

(e) detecting data exceeding a threshold value from among the accumulated data as target signals; and

(f) reading a target range based on the detected target signals, wherein

(a) through (d) are repeated N times, and the accumulated data in (e) are obtained by repeating (a) through (d) N times.

2. (Original) The method of claim 1, wherein (b) comprises: canceling a noise component from the electrical signal and converting the noise-cancelled signal into range-finding data.

3. (Original) The method of claim 2, wherein (a) comprises: receiving the laser beams, converting the same into a corresponding photocurrent signal, and converting the signal into a voltage signal, and

(b) comprises: differentiating the voltage signal to cancel a voltage component superimposed on the voltage signal and caused by background scattering of laser beams, exponentially decreasing according to ranges.

4. (Original) The method of claim 3, further comprising: filtering the

differentiated signal with a predetermined frequency bandwidth identical to a frequency band of the target signal, wherein

the bandwidth satisfies $0.35/t_r$ (t_r is a rising time of a laser pulse), and a cut-off frequency satisfies $1/2\tau$ (τ is a full width at half the maximum).

5. (Original) The method of claim 1, wherein (e) comprises: establishing a threshold value to satisfy the following conditions:

$$FAR = N_S \int_{L_T}^{\infty} \frac{1}{0.5\sqrt{N}\sqrt{2\pi}} e^{-\frac{(x-0.5N)^2}{0.5N}} dx = N_S\left(0.5 - \int_0^{TNR} \frac{1}{\sqrt{2\pi}} e^{-\frac{y^2}{2}} dy\right)$$

and

$$P_D = \int_{L_T}^{\infty} \frac{1}{\sqrt{p(1-p)N}\sqrt{2\pi}} e^{-\frac{(x-pN)^2}{2p(1-p)N}} dx = 0.5 + \int_0^{SNR(N)-TNR} \frac{1}{\sqrt{2\pi}} e^{-\frac{y^2}{2}} dy$$

where P_D is a detection probability, FAR is a false alarm rate, N_S is a number of range finding samples = maximum finding range/range finding resolving power, N is accumulated times, L_T is a threshold value = $0.5\sqrt{N(TNR)}+0.5N$, TNR is a threshold-to-noise ratio, SNR(1) is a signal-to-noise ratio of the system, and SNR(N) is the SNR when accumulated N times = $\sqrt{N(SNR(1))}$.

6. (Original) The method of claim 1, wherein the target range in (f) is an address of a memory storing accumulated data greater than the threshold value.

7. (Currently Amended) A laser rangefinder for finding a range to a target using laser beams, comprising:

a laser receiver for receiving laser beams reflected from the target to output an electrical signal, canceling a noise component provided in the electrical signal, and outputting binary range-finding data;

a data accumulator, including a frame memory, for adding the range-finding data output by the laser receiver and previously accumulated data stored in the frame ~~RAM~~ memory, storing the added results in the frame memory, and repeating the adding and storing operations for an established time; and

a range detector for producing a target range to the target based on the accumulated data stored in the frame memory.

8. (Original) The laser rangefinder of claim 7, wherein the laser receiver comprises:

a photodetector for receiving the laser beams and outputting a corresponding photocurrent signal;

an amplifier for amplifying the photocurrent signal and converting it into a voltage signal;

a differentiator for differentiating the voltage signal and canceling a noise voltage component superimposed on the voltage signal;

a filter for filtering the differentiated signal; and

a signal converter for converting the filtered signal into binary range-finding data, and outputting the range-finding data for each frame.

9. (Original) The laser rangefinder of claim 8, wherein the signal converter comprises a zero voltage detector for comparing the filtered signal with a zero voltage, and outputting 1 when the signal is a positive voltage, and 0 when the signal is a negative voltage.

10. (Original) The laser rangefinder of claim 7, wherein the data accumulator further comprises:

a shift register for sequentially storing the range-finding data;

an adder for adding the range-finding data stored in the shift register and previously accumulated data stored in the frame memory, and storing the added results in the frame memory;

a counter for counting range-finding time; and

a timing controller for operating the shifter register and the adder until the range-finding time exceeds the established time, and repeating the storing, operating, and accumulating process of the range-finding data N times.

11. (Original) The laser rangefinder of claim 7, wherein the range detector comprises:

a target signal detector for detecting the data exceeding the established threshold value as a target signal from among the accumulated data stored in the frame memory; and

a range reader for reading an address of the frame memory storing the detected target signal as a target range.

12. (Original) The laser rangefinder of claim 11, wherein the range reader sorts target signals in the ascending order according to addresses of the frame memory storing the target signals when the detected target signals are plural, and the range reader reads the address having the largest value as a target range of the target from among the sorted addresses.

13. (Original) The laser rangefinder of claim 10, wherein the laser receiver further comprises a receiver for receiving laser beams output from the rangefinder to generate a laser oscillation signal,

the timing controller generates a laser start pulse according to the laser oscillation signal, and repeats the storing, operating, and accumulating process of the

range-finding data N times until a laser stop pulse is provided, and

the range counter counts range-finding time according to the laser start pulse, and outputs a laser stop pulse to the timing controller when the counted range-finding time exceeds the established time.

14. (Original) The laser rangefinder of claim 10, wherein the data accumulator further comprises an address controller for controlling data storage into the shift register and the frame memory.

15. (Original) The laser rangefinder of claim 7, further comprising a display for displaying the target range.

16. (Cancelled)

17. (Original) A range detecting device of a laser rangefinder for finding a range to a target using laser beams, the range detecting device for detecting a target range based on range-finding data corresponding to the laser beams reflected and received from the target, comprising:

a data accumulator including: a shift register for sequentially storing the range-finding data; a frame memory for storing previously accumulated data; an adder for adding the range-finding data stored in the shift register and the previously accumulated data stored in the frame memory, and storing the added results in the frame memory; a counter for counting range-finding time; and a timing controller for operating the shifter register and the adder until the range-finding time exceeds the established time, and repeating the storing, operating, and accumulating process of the range-finding data N times; and

a range detector including: a target signal detector for detecting data exceeding an established threshold value as target signals from among accumulated data stored in

the frame memory; and a range reader for reading an address of the frame memory storing the detected target signal as a target range.